Wisconsin
Department of Commerce

Evaluation # New Product #200790000
Replaces #200700-I

Safety & Buildings Division
201 West Washington Avenue
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Wisconsin
Building Products Evaluation

Material	Insulated Concrete Forms
Manufacturer	Standard ICF Corporation 425 2ND Ave. SW Oronoco, Minnesota 55960

SCOPE OF EVALUATION

GENERAL: This report evaluates the use of the Insulated Concrete Form Wall System, manufactured by Standard ICF Corporation evaluated as permanent form work and insulation system for reinforced concrete beams, lintels, exterior and foundation and retaining walls. The Standard ICFs™ were evaluated for safety requirements of the foam plastic and structural requirements for the codes listed below.

This review includes the cited **Comm** code requirements below in accordance with the current **Wisconsin Uniform Dwelling Code for 1 & 2 family dwellings (UDC):**

- **Foam Plastic:** The Standard ICF Insulated Concrete Form Wall System was evaluated in accordance with the fire safety requirements of **s. Comm 21.11**.
  - **Structural:** The Standard ICF Insulated Concrete Form Wall System was evaluated in accordance with the structural requirements of **ss. Comm 21.02,** and **21.02(3)(c)**.

The **IBC** requirements below in accordance with the current **Wisconsin Amended ICC Code:**

- **Foam Plastic:** The Standard ICF Insulated Concrete Form Wall System was evaluated in accordance with the fire safety requirements **ss. IBC 2603.1**, **2603.2**, and **2603.3**.
  - **Structural:** The Standard ICF Insulated Concrete Form Wall System was evaluated in accordance with the requirements of **IBC Chapter 16**.

Note: Structural calculations shall be submitted (job-to-job basis) in accordance with IBC Chapter 16 for Live, Ground Snow, Roof, Wind, and Seismic Loads.

DESCRIPTION AND USE

General: Standard ICF Insulated Concrete Forms (Standard ICFs™) are used to build monolithic above and below grade concrete walls for residential, multi-family and light commercial buildings.

Standard ICFs™ are made of molded BASF Corporation expandable polystyrene beads designated as Styropor Types BF and BLF, and Huntsman Grade 54 and Grade 40 expandable polystyrene beads used to produce expanded polystyrene products that comply with Types I, II, VIII and IX [1.0, 1.5, 1.25 and 2.0 pcf nominal densities.

The formed blocks are integrated with a hard plastic, stud wall-tie bracket system. Standard ICFs™ are molded to a net cured weight density of 1.5 pounds per square inch. When filled with concrete they form a monolithic concrete wall.

Standard ICFs™ are pre-molded and are ready to install. Standard ICFs™ **Straight Forms** are 48 inches long, 16 inches high, 11-1/4 inches wide, and weigh 6 pounds. The **90° Corner Forms** are 48 inches (18+30) long, 16 inches high, 11-1/4 inches wide, and weigh 5 pounds. The **45° Corner Forms** are 48 inches (18+30) long, 16 inches high, 11-1/4 inches wide, and weigh 5.5 pounds. All the forms have an exterior surface area of 5.33 square feet and will form a nominal 7 inches (6-1/5 inches) interior concrete core. One cubic yard of concrete will fill 10.5 straight forms or 13.75 corner forms.

Concrete: Normal-weight concrete complying with **s. Comm 21.02(3)(b)**, and **s. IBC 1903.1** with maximum aggregate size of 3/4 inch and a minimum compressive strength of 3,000 psi.

Reinforcement: All steel reinforcement shall be in accordance with **s. IBC 1903.5**.

Each pallet of Standard ICFs™ shall bear a label with the manufacturer's name, and the quality control inspection agency (Intertek ETL SEMKO Certification).

TESTS AND RESULTS

The tests and results listed below cover both the current WI Building Code **Comm** and **IBC** requirements:

Intertek ETL SEMKO conducted testing on the Standard ICFs™. The Standard ICFs™ produced by Standard ICF Corporation have been subject to and complied with the following testing:

The BASF Corporation expandable polystyrene beads designated as Styropor Types BF and BLF, and Huntsman Grade 54 and Grade 40 expandable polystyrene beads have a maximum flame-spread rating of 25 and a maximum smoke-developed rating of 450. Testing was done in accordance with ASTM E 84.

Polypropylene web material conforms to CC1 Plastic material when tested in accordance with ASTM D1929 Flash-Ignition Temperature was 360ºC (680ºF) Flaming and Spontaneous-Ignition Temperature was 390ºC (734ºF) Flaming.

Testing in accordance with D635 was conducted on the polypropylene web material. The average burned length was 75 mm and the average burning rate was 12.3 mm/min.

Testing in accordance with D2843 produced a maximum smoke density 11.4 and a smoke density rating of 7.0.

The expandable polystyrene beads were tested for apparent density, compressive properties, and flexural properties in accordance with ASTM C578-95 "Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation," using the following test methods:

Apparent Density: ASTM D1622-98 "Standard Test Method for Apparent Density of Rigid Cellular Plastics".
Compressive Properties: ASTM C165-00 "Standard Test Method for Measuring Compressive Properties of Thermal Insulation".

Flexural Properties: ASTM C203-99 "Standard Test Method for Breaking Load and Flexural Properties of Block-Type Thermal Insulation"

LIMITATIONS OF APPROVAL

The limitations below are in accordance with the current **Wisconsin Uniform Dwelling Code (UDC), for 1 & 2 family dwellings:**

- **Foam Plastic:** The Standard ICFs™ wall system is approved for use with a thermal barrier to separate the blocks from interior spaces in accordance with **s. Comm 21.11(1)**. Where a 1-inch thickness of masonry does not separate the polystyrene blocks from the building interior, including at the top of the wall, a thermal barrier, which has a finish rating of at least 15 minutes, shall be provided.

1. Standard ICFs™ are approved for use in combustible non-rated construction in accordance with **s. Comm 21.11**. In one- or two-family dwellings, thermal barriers shall be provided to separate the forms from the occupied space of the dwellings per **s. Comm 21.11**.
2. The exterior face of the blocks shall be finished with an approved weather covering and must be protected from ultraviolet light.

- **Structural:** The Standard ICFs™ are approved as structural building elements.

1. The units are approved for use as concrete forms for basement walls and exterior walls when the resulting concrete core thickness satisfies **Table 21.18-A** for one- or two-family dwellings, or when structural calculations for the product are submitted for review.
2. Walls shall be anchored to all floors and roofs. Walls shall be interconnected at corners by embedding and lapping the reinforcement.
3. Structures are **limited** to two stories in height.
4. Structural calculations are submitted to the department by a Wisconsin registered professional engineer or architect.
5. Below grade walls shall be damp-proofed when required by the local building department.
6. Damp proofing and waterproofing materials shall be approved by Standard ICF Corporation and the local building official, and shall be free of solvents that will adversely affect the EPS foam.

NOTE: The Standard ICFs™ Wall System was **not** evaluated for compliance with the thermal requirements of **Subchapter VI, ss. Comm 22.20**, **22.21**, **22.23**, **22.25**, **22.27**, **22.28**, and **22.31** of the current UDC.

The forms are approved for use as concrete forms for basement walls, exterior walls and retaining walls when The **IBC** limitations below are in accordance with the current **Wisconsin Amended IBC 2000 Code:**

- **Foam Plastic:** The Standard ICFs™ wall system is approved for use with a thermal barrier to separate the blocks from interior spaces in accordance with **s. IBC 2603.4.**

1. In accordance with **s. IBC 2603.4.1.6**, Standard ICFs™ are used within the attic, crawl space or, where entry is made only for service utilities, the foam plastic insulation shall be protected against ignition by 1-1/2" thick mineral fiber insulation, a ¼" thick wood structural panel, particleboard or hardboard, gypsum wallboard, corrosion-resistant steel or other approved material installed so that the foam plastic is not exposed.
2. The protective covering shall be consistent with the requirements for the type of construction.
3. The exterior face of the blocks shall be finished with an approved weather covering and must be protected from ultraviolet light.
4. The crawl space shall not be used for storage or air handling purposes, there are no interconnected basement areas and entry to the crawl space is only for service of utilities.

- **Structural:** Design of concrete formed by Standard ICFs™ must comply with **IBC Chapter 19** with the following requirements:

1. The forms are approved for use as concrete forms for basement walls, exterior walls and retaining walls when structural calculations are submitted to the department by a Wisconsin registered professional engineer or architect.

2. Design calculations of walls must comply with **s. IBC 1901.2.** Use of the empirical design approach specified in **s. 2109.1 [Comm 62.2109(1)]** is prohibited.
3. Design of lintels shall comply with the applicable provisions of **IBC Chapter 16.**
4. Wall loading shall be in accordance with **IBC Chapter 16**.
5. Minimum wall reinforcement shall conform to **s. IBC 1901.2**. When the code requires that vertical and horizontal reinforcement be spaced no further apart than 18 inches or three times the wall thickness, whichever is less, the maximum concrete wall thickness along the length of the wall is permitted to be used to determine rebar spacing.
6. Walls shall be anchored to floors and roofs in accordance with **s. IBC 1604.8.2**. Walls shall be interconnected at corners by embedding and lapping reinforcement in accordance with the code.
7. Design of shear walls shall be in accordance with **ss. IBC 1901.2** and **1910**.
8. Structures are **limited** to two stories in height plus a basement.
9. Below grade walls shall be damp-proofed when required by the local building department, water-proofed in accordance with **s. IBC 1806**.
10. Damp proofing and waterproofing materials shall be approved by Standard ICF Corporation and the local building official, and shall be free of solvents that will adversely affect the EPS foam.
11. Special inspection is required as noted in **s. IBC 1704**, for placement of reinforcing steel and concrete, and for concrete cylinder testing, except that special inspection is not required for foundation stem walls conforming to **Table 1805.4.2** of the **IBC**. Additionally, when the building official approves, special inspection is not required when all of the following conditions are met:

    a) Wall systems are a maximum of 8 feet high and are limited to use in single-story construction of Group R-3, or Group U Occupancies.
    b) Maximum height of a concrete pour is 48 inches. Succeeding lifts must be placed in accordance with **s. IBC 1905.10.**
    c) Installation is by properly trained installers approved by Standard ICF Corporation.
    d) The installation instructions indicate methods used to verify proper placement of concrete.
12. Walls constructed with Standard ICFs™ are considered Type V Construction.

Alternate Design: In lieu of calculations, the structural design of reinforced concrete formed by Standard ICFs™ Insulated Concrete Form Wall System insulated concrete form blocks for residential construction is permitted to comply with the *Prescriptive Method for Insulating Concrete Forms in Residential Construction* (publication No. EB118), dated May 1998, published by the Portland Cement Association (PCA). Buildings constructed with the Standard ICFs™ Insulated Concrete Form Wall System insulated concrete form system and designed in accordance with the alternate design, will not exceed a height of two stories plus a basement, where the maximum unsupported wall height is 10 feet.

NOTE: The Standard ICFs™ Wall System was **not** evaluated for compliance with the thermal requirements of **s. Comm 63.1018**.

Identification: Each package of Standard ICFs™ shall bears a label specifying the name and address of the manufacturer (Standard ICF Corporation; 425 2ND Ave., SW, Oronoco, Minnesota 55960). Additionally, product labels indicate the Wisconsin Building Product Evaluation Number (**200700-I**), and the name and logo of the quality control agency.

This approval will be valid through December 31, 2012, unless manufacturing modifications are made to the product or a re-examination is deemed necessary by the department. The product approval is applicable to projects approved under the current edition of the applicable codes. This approval may be void for project approvals made under future applicable editions. The Wisconsin Building Product Evaluation number must be provided when plans that include this product are submitted for review.

DISCLAIMER

The department is in no way endorsing or advertising this product. This approval addresses only the specified applications for the product and does not waive any code requirement not specified in this document.

Revision Date:
Approval Date: April 4, 2007 By: _____

Lee E. Finley, Jr.
Product & Material Review
Integrated Services Bureau

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